they do not assure of absolute protection against aspiration.

5. With a proper combination of the methods mentioned in these studies, aspiration hazards may be markedly reduced.

432 South Boyle Avenue.

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## RESUSCITATION OF THE NEW-BORN*

*By* KARL L. SCHAUPP, M. D.
*San Francisco*

THERE is no phase of obstetric practice which is more important and yet gets so little attention as does the resuscitation of the new-born child.

Fortunately most infants cry spontaneously upon being born and the circulatory changes take place without incident, but in many instances there is delay in the establishment of one or both functions and it becomes necessary to use artificial means in the attempt to preserve life.

It is not my purpose to introduce a new means of resuscitation but to recall the importance of the subject, to point out certain errors in the practice and to suggest those methods which have the most merit.

Since the birth of a living and healthy child into the world is the sole purpose of pregnancy and labor, there is necessarily a failure unless this purpose has been accomplished. To those who are called upon to attend the mother through this function, comes the responsibility of sustaining the new life; skillfully, patiently and gently using all means available.

### BASIC PRINCIPLES IN TREATMENT OF ASPHYXIA NEONATORUM

There are two important principles in the treatment of the asphyxiated new-born. First, that the respiratory passages are free from blood, mucus and amniotic fluid. Second, that the body temperature be not allowed to fall below normal. In the former instance all that is usually necessary is to suspend the child by the feet, allowing the head to rest upon the table. The mouth and throat are then gently wiped free of mucus by use of two folds of gauze over the little finger, or the throat is massaged upward gently. As a rule these measures are sufficient to clear the lungs. Where there has been deep aspiration of amniotic fluid, it becomes necessary to use gentle artificial respiration during which the child is still suspended. This almost always frees the lungs of fluid. Where these maneuvers have failed to give results it may become advisable to aspirate the mucus by use of a bulb aspirator or the tracheal catheter.

During the time necessary to carry out such manipulations there has been rapid evaporation from the wet skin of the child and a rapid fall in the temperature. To prevent this fall from progressing to a dangerous point, the use of a warm water bath is the most successful.

The water bath has two distinct functions: to maintain body temperature, as already mentioned, and to stimulate respiration and circulation. If the bath is tepid it has no stimulating effect; to obtain that result, it must therefore be warm to the hand. By the addition of hot water, which raises the temperature more rapidly, the stimulat-

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ing effect becomes evident: the skin becomes pink, the pulse stronger, and respirations often become strong and regular.

It is not advisable to keep the child in a water bath too long, so warm blankets should always be available, and the child should be well covered as soon as regular respirations have been established, even if there has been no cry.

In instances where success has not been attained by these measures it becomes necessary to further stimulate. Among the older means are the use of cold tubs and spanking. Both of these means while very efficient may become equally dangerous. The cold bath should be iced and if used at all should be only as an instantaneous plunge, the child being immediately returned to the warm water. It is much better to lift the body of the child out of the warm water and to dash a few drops of the cold onto the chest. In several instances that have come to my knowledge I feel sure that the life of the baby has been lost for the sole reason that the shock of immersion into the cold water was sufficient to stop the feeble attempts at respiration.

In spanking, the tips of the fingers only should come in sharp contact with the buttocks. If the full hand is used over the same area the force of the blow may be sufficient to injure the spine, and if the blow is directed over the lumbar or thoracic region very serious damage may result. Many autopsies that show a ruptured liver or kidneys can be traced directly to this cause. Unless one understands this maneuver, one had better not use it; it is very simple and may be efficacious, and yet it is dangerous.

Artificial respiration is necessary to sustain life in the absence of spontaneous respirations. By this method the heart may be kept beating for long periods. The old jack-knife maneuver seems to have stood the test of time better than any other, but this also has its dangers. Chief of these is that too vigorous compression may injure the lungs or abdominal viscera, most often rupture the liver. This procedure must be executed gently but with sufficient force to compress the lungs, and the extension must be sufficient to inflate them but not to the degree of overextension, which causes abnormal tension.

A very excellent means of stimulation is the rubbing of the skin, especially that of the thorax, with a dry towel spread over the loosely extended fingers, the tips only coming in contact with the infant. This may be quite vigorous and still do no harm if the fingers are not stiffened and heavy pressure is not made. Many babies respond to such treatment when other means have failed.

Inflating the lungs by blowing into the infant's mouth must also be very gently carried out because it is very easy, by slightly increased pressure, to rupture the alveoli of the lungs and to produce fatal trauma. In one such case at autopsy the pleura was found elevated into numerous small blisters. The rupture of the alveoli permitted the air to penetrate the lung tissue and separate the pleura.

The use of oxygen, unless perfectly controlled, also carries this same danger, even in the event that a catheter is used. An added danger here is that the catheter may be passed through the mouth or nose, into the esophagus. In two instances this was fatal to infants because, without proper control, the oxygen was turned on with force enough to inflate the stomach and intestinal tract and caused rupture. In one of these cases the pressure was so strong that the gas escaped from the anus.

Perhaps the best method of inflating the lungs is by use of one of a number of instruments by means of which a mixture of 5 per cent carbon dioxid gas with 95 per cent oxygen is passed into the lungs under complete control. It passes through a large, soft rubber bag in which the gas accumulates and is allowed to enter the air passages gently and at intervals, simulating the regular respiratory rate. The most important factor in this method is the presence of the carbon dioxid which acts as a strong respiratory stimulant. I feel certain that this can save more babies than any other method.

The use of Alpha lobelin seems to have definite merit. It is injected intramuscularly and often causes regular respirations to begin. Even though it is not always effective, the drug should certainly be present in every delivery room.

When the problem is one of cardiac failure there are fewer treatments available. The gentle massage of the heart through the chest wall often brings about improvement. As a last resort adrenalin injected into the heart muscle itself may start contractions which have been absent or imperceptible since birth. When it works, it is very dramatic and is life-saving.

The methods and dangers that have been discussed are familiar to all of you, but it is the purpose of this paper to recall them to mind and to call your attention again to the fact that the most important factor of all in the resuscitation of the new-born is gentleness and that next to it comes patience. Many times when we feel discouraged after long effort and are tempted to admit defeat, we begin to get results. How often have you seen one person give up the problem as hopeless and have then seen another take up the work and succeed. My big lesson came one day when I saw an experienced man pronounce a child dead and then saw two nurses resuscitate it.

We have often seen physicians struggle valiently to preserve the spark of life in an old patient who is dying of an incurable disease and we see others give up after a few moments of half-hearted effort when the patient is a new-born child; a young life with untold possibilities ahead of it.

To repeat, it is the purpose of our profession to conserve life; to assist into the world living and healthy children. Where the struggle has been the hardest and where success has been the longest deferred, there we find our greatest reward.

490 Post Street.